

CENTRAL INTELLIGENCE AGENCY

OFFICE OF CENTRAL REFERENCE

MINICARD PROJECT

TASK TEAM REPORT NO. 12

TTR/12

DATE:

MEMORANDUM FOR: Assistant Director, Central Reference

SUBJECT : Final Report on Minicard Project, Task Team No. 12

1. Membership

Deputy Chief, Document Division, CR

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Acting Chief, Machine Division, CR

Chief, Business Machines Service, Management Staff

Intelligence Production Staff, OSI

Reference Branch, CIA Library, CR

2. Methods of Task Team Operation

(deceased) Chief, Machine Division, the Chairman of this Team before his death, drew up the outline for the report, briefed the Team on the many phases of the Minicard and other mechanical systems and assigned sections of the report to the members for drafting. We believe this report generally reflects ideas and the recommendations he had in mind as well as the consensus of the Team.

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3. Recommendations

We recommend:


- a. A Minicard Pilot Operation Staff be established immediately in OCR (page 4) with the terms of reference as outlined in Appendix B. This staff should be made up of personnel from the OCR operating divisions with the Chief and key members detailed on a full time basis.
- b. A pilot Minicard operation under the direction of this staff be started as soon as possible.

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- c. Representatives of the OCR Registers study the Minicard System and collaborate with the staff to determine to what extent it can be used to advantage for their purposes. (See page 7)
- d. Experiments be started in OCR to develop expanded concepts of coding techniques applicable to the interests of Research Offices in order to develop methods for the retrieval of information not based on preconceived concepts. Such experiments should be in line with conclusions reached by the other task groups and be directed by an OCR Planning and Management Staff. (See Part IV beginning on page 20)

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PROJECT 12, MINICARD TASK TEAM

MINICARD PROJECT

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Part I. Assignment, Conclusions and Scope of Report.

1. Assignment

The task of Project Twelve consists of determining if:

- a. Minicard offers advantages over Intellofax.
- b. The Minicard pilot operations have been satisfactorily planned (and to develop a current plan).
- c. OCR should have a continuing high level planning and management staff to investigate new ideas.

2. Conclusions

After much discussion and investigation of the files, plans and other material pertinent to the above questions, we prepared this report and arrived at the following answers:

- a. We believe that Minicard does offer many advantages over Intellofax and will substantially improve OCR's support of intelligence research.
- b. A satisfactory plan for running a pilot operation for the machine aspects of the Minicard System has been developed by the Machine Division. However, we feel that OCR has been remiss in not having established a "Task Group" (as provided for in the Minicard Project Outline - see Appendix A) to run a complete pilot operation. We recommend therefore that a Minicard Pilot Operation Staff of the OAD/CR composed of a Chief and personnel from the Machine and Document Divisions and the CIA Library be organized immediately to develop policies and procedures for, and to direct the pilot Minicard operation system. This system should include the complete document processing cycle of receipt, analysis, input, retrieval and preparation of final products for the research analyst. The pilot operation should be started as soon as possible.

(Our recommended terms of reference for the proposed Minicard Pilot Operation Staff are contained in Appendix B.)

- c. This group believes that OCR should have a high level planning and management staff to investigate new ideas of document receipt, dissemination, indexing and retrieval; to keep abreast of new developments in this field; and to study continually the OCR system in order to recommend changes to improve its efficiency and service to user offices. If the proposed Minicard Pilot Operation Staff were to be included as part of an OCR Management and Planning Staff, it is recommended that personnel assigned to the Minicard Pilot Operation be permitted to concentrate exclusively on that project.

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3. Scope of Report

This report compares the Intellofax and Minicard Systems; describes the present plan for "debugging" the Minicard machinery and for developing operational procedures which will make possible an orderly transition from the Intellofax to the Minicard System; recommends ways of developing the Minicard System as a more useful reference aid; and discusses the specific comments made by the Library Consultants regarding the Minicard Project. We have assumed it is not within the scope of our assignment to determine what categories of documents should be indexed, what specific information in the documents selected should be coded and what classification system(s) should be used to best support intelligence research. However, we feel that continued study and experimentation is necessary to increase the "intellectual level" of indexing, to make use of Minicard's advanced photo-electronic capabilities and must be considered by OCR as part of its overall responsibility of improving its service to users. The importance of developing adequate codes and properly assigning such codes for indexing and retrieval purposes must be recognized. If inadequate codes are used or adequate codes are not properly applied, Minicard or any other system can only fail in meeting the needs for which it was designed.

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Part II. Comparison of Intellofax and Minicard Systems.

A. Brief Description of Two Systems.

1. Attached as Appendix C are simplified flow charts showing the significant input and retrieval steps for the two systems.
2. The Intellofax System provides bibliographic references on punched cards by specified subject and/or area to information reports filed primarily on microfilm in aperture cards. Desired reports may be viewed on microfilm in the CIA Library or paper prints of individual reports may be obtained. Printed bibliographic references to the information reports are also filed by source for cross reference and research purposes. A paper "Intellofax" tape listing bibliographic references to information reports printed from selected IBM cards and pertinent to specific subject and/or area requests is available under this system. The information reports when received are analyzed and coded in accordance with the Intelligence Subject Code (ISC) which is also used to code requests for retrieval of reports (or references) which have been processed. Only the mechanical aspects of the coding are considered within the scope of this report; the "intellectual level" of the classification process as relates to input and retrieval is being considered by other task groups.
3. The Minicard System utilizes a microphotographic medium in the form of a piece of film, 16 mm x 32 mm, called the Minicard. Alphabetic-numeric information and photographic images can be carried on the Minicard and the composite product produced in sufficient copies to permit deposit of a complete record at each significant code location. Under the system images of the actual documents are available at the same time the coded references to such documents have been selected out of file in response to requests specifying subject(s), and/or area(s), and/or other coded or previously entered clear text information. It is also planned in the Minicard System to incorporate the aperture card file and a substitute for the source card file. These two files are discussed in Part II C and II D of this report beginning on page 12.
4. The Minicard System when developed should offer many advantages over Intellofax. Some of these are:
 - a. A more sophisticated searching technique. Many subjects, areas, action codes, names of persons, organizations, etc., as well as document images can be recorded in one Minicard group which will remain together in the file and permit multifaceted search procedures. Under Intellofax not only is the amount of information which can be coded into the cards greatly limited as compared to Minicard but searching for specific relationships between the various separate subject and area files by IBM collator would be an endless time-consuming task. With all the information contained in one Minicard (or two or more filed together) the desired relationships can be searched for and if indicated can be selected out immediately.

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- b. Subsidiary files can be created for specific purposes as may be required depending on the type and amount of information "inputted." This suggests that as a bi-product of the Central Minicard System, a document retrieval system for the Registers (IR, BR and GR) might be developed. These possible bi-product should be considered by the Minicard Pilot Operation Staff in collaboration with the Registers.
 - c. Processing time for input and retrieval should be shortened and aperture and source cards would be in file for service and reference purposes in less time than under Intellofax.
 - d. The small size of the Minicard will reduce the volume of files to a great extent. One file block of 200,000 Minicards which is the equivalent of approximately 100,000 punched cards and their related documents will take up approximately $1\frac{1}{2}$ cubic feet of space. Space consideration would no longer be paramount in determining when to retire subject and area files.
 - e. With Air Force, AFCIN, 1B, using the same equipment and classification system, Minicards can be inter-changed which will save the duplicate processing of each others reports.
5. Minicard has the same disadvantage as most other mechanical retrieval systems in that it is a blind system; the Minicards can be handled and selected out of file only by mechanical means. In addition the small size of the "cards" on photographic film will require rigid standards of practice to assure optimum quality of reproduction and control at all stages in the system in order to maintain accuracy of the final products.
6. The Minicard equipment is just now emerging from the development stage, and as with newly developed complex machines, there will be much "debugging" required and many necessary modifications to adapt the set of machines to a document "input" and "retrieval" system suitable for serving OCR's requirements. What all these modifications will be can only be determined by experimentation in a complete system pilot operation run separate from the Intellofax System. It is possible that the pilot operation will reveal deficiencies in the equipment or in the elapsed time required to process individual requests for retrieval service coincidentally with processing a large volume of documents into the system; it also will reveal the appropriate end products which will serve the user offices and outside agencies best. The Minicard equipment has the photo-electronic potential to out-perform the IBM equipment in the Intellofax System and incidentally it should resolve the pressing space problem. The equipment has already been purchased; some has been received and is in operation and the balance is due for delivery within two or three months. So OCR should immediately start a complete pilot operation to determine exactly what people, machines, space, training, time, classification system, methods and procedures will be required to substitute the Minicard System for the present Intellofax. The experience gained with Intellofax during the past 10 years and the relatively stable and mature organization which OCR now services should make it possible to evolve a highly efficient reference system using the Minicard equipment for raw information reports as well as for other categories of documents.

Part II.

B. Comparison of Personnel, Machine and Space Requirements.

1. Personnel and Machine Costs.

The table below on page 10 is a comparison of the estimated costs for the Intellofax and Minicard Systems, excluding supervision and administrative expense and the cost for operations which are considered the same under either system. The identical operations are:

- a. Receipt, screen, batch and disseminate.
- B. Analysis and code.
- c. Maintain source files.
- d. Receive and code requests for machine searches.

The estimates indicate that the Minicard System would save over \$75,000 in personnel costs per year while machine costs would increase by some \$4,000. However, it should be noted that in arriving at the estimates for the Minicard System the following assumptions were made:

- a. That under the Minicard System, it is not necessary to operate a dual system. Actually it will be necessary to maintain request service and files for the Intellofax System for at least five years after the change over to Minicard which will increase the costs for a five year period. In addition, the costs of the change over for employee training, job reclassification, procedures' development, experimentation, organizational changes and normal passive resistance to change has not been reflected in these estimates.
- b. That the volume of documents and retrieval requests processed under Minicard will be the same as during 1957 for Intellofax.
- c. That Air Force and CIA have developed a joint program for exchanging Minicards to save the duplicate processing of each others reports.
- d. That the cost of machines is distributed over a 10 year period. It should be noted that the annual machine cost of \$20,000 for preparing Intellofax tapes is for the machines which will shortly be replaced by card list cameras. Substituting these cameras will reduce the Intellofax machine costs by an estimated \$18,000 per year.
- e. That there is no substantial difference in the cost of materials for processing the documents between Intellofax and Minicard.

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This group feels that these estimates of the cost for Minicard System are mere "guesstimates" and that proper estimates can only be developed by a pilot operation when detailed steps and procedures can be determined realistically. Our guess at this stage is that the Minicard System when evolved should require fewer personnel to process the present volume of documents and retrieval requests, but that machine costs will be higher. We also know that the change over and a five year dual system operation is going to increase costs considerably over those for a continued operation under Intellofax. However, the possibilities of better service by OCR to its customers must be weighed against these increased costs when both have been realistically determined by the proposed Minicard Pilot Operation Staff. And as stated throughout this report, we believe the pilot operation to test the Minicard equipment in a complete system for document input and retrieval should be started immediately so that proper estimates can be developed at an early date on which to base the decision of whether to change over from Intellofax to Minicard, or continue with Intellofax.

Detailed listings of the personnel and equipment requirements are shown in Appendix D.

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COMPARISON OF COSTS

	Intellofax			Minicard		
	Personnel	Equip.	Total	Personnel	Machines	Total
<u>Input</u>						
1. Doc'ts. Recd., # Screened, Batched & Copies Dissem.	*(200,110)	-	*(200,110)	*(200,110)	-	*(200,110)
2. Copy Analyzed #	*(153,800)	-	*(153,800)	*(153,800)	-	*(153,800)
3. Multilith Mats Typed & Repro- duced	69,135	1,815	70,950	-	-	-
4. Doc'ts. Micro- filmed	25,270	936	26,206	18,860	8,708	27,568
5. Aperture Card Prepared	26,160	5,924	32,084	73,259	17,630	90,889
6. Cards Made & Filed by Subj. & Area	32,301	13,344	45,645			
<u>Retrieval</u>						
7. Code Request #	*(11,000)	-	*(11,000)	*(11,000)	-	*(11,000)
8. Control & Machine Requests	31,307	9,332	40,639	27,400	14,828	42,228
9. Prepare Intello- fax Tape or Print Minicards	5,440	20,000	25,440	3,670	2,082	5,752
10. Maintain Aperture File (Service Requests)	25,590	2,474	28,064	11,010	3,560	14,570
11. Maintain Source File	*(10,500)	-	*(10,500)	*(10,500)	-	*(10,500)
<u>Machine Maintenance</u>						
12. Maintenance of Equipment	16,320	751	17,071	19,400	11,000	30,400
TOTAL (Excl. 1, 2, 7 & 11)	231,523	54,576	286,099	153,599	57,808	211,407

Amounts taken from Report prepared by Management Staff for Library Consultants.

* Assume same operation under each system - omitted from totals.

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2. Comparison of Space Requirements.

The space needed for the files under Minicard as compared to the present Intellofax System will be greatly reduced and the space required for typing multilith mats and their reproduction will be entirely eliminated. The following estimates show that some 3,500 square feet of space less will be needed by Minicard than for Intellofax, assuming that Intellofax has been completely phased out of all operations:

Operation Involved	Space Requirements Sq. Ft.	
	Intellofax	Minicard
1. Receipt, Screen, Batch, Disseminate	(same)	(same)
2. Analyze and Code	(same)	(same)
3. Type and Reproduce Mat	1,105	-
4. Camera Room	400	434
5. Mount Film in Aperture Cards	150	150
6. Code Requests by Library	(same)	(same)
7. Machine Control Section	880	110
8. IBM Key Punch Section	450	300
9. IBM Tab Section	550	320
10. Make Intellofax Tapes or Print Minicards	648	373
11. Process Film (all phases)	534	
12. Maintain Aperture Card File	700	600
13. Subject and Area Files	455	22
14. Maintain Source Card Files	(same)	(same)
TOTAL	5,872	2,309

This group believes that a Minicard System operation should result in a large saving of space over Intellofax, but the probable extent will have to be estimated as a result of the pilot system operation which has been recommended.

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Part II.

C. Discussion of "Source" Files.

1. The present source file maintained under Intellofax in the Library consists of 3 x 5 cards, each representing a single document and containing specific bibliographic information which includes control number, source, post, report number, date, classification, title, pagination and enclosure data. Arrangements are by source, post and report number, or, when this is not applicable, by some other logical scheme. The file is used more than 800 times a week for the following purposes: (a) to check for receipt of a specific document, (b) to obtain control numbers, (c) to verify bibliographic information, (d) to record data on security reclassification, (e) to make searches of reports from a single post. The CIA Library estimates that the file is referred to 40% of the time to determine control numbers; 50% to obtain enclosure information and 10% for other purposes.
2. It would seem that a cross reference index made from the punched cards used for input processing together with the aperture card file would answer over 90% of the inquiries made on the present "source" file. Less than 10% of the inquiries consist of browsing through the source file to identify reports for which specific references are not known.
3. Some of the possibilities for a "source" file in the Minicard System are as follows:
 - a. The first is to make the production of source cards an automatic process and provide them as a product of the Minicard System. A photograph of the upper third of each document would be reproduced on a 3 x 5 card of heavy paper stock suitable for filing. It would contain all of the information now typed on a source card except for pagination and enclosure information. Some scheme for adding this data would have to be devised; and provision would be made for handling studies or other materials whose format does not conform to the serial intelligence report. There are certain advantages to this scheme: it would be essentially an automatic operation, it would be rapid, with cards available for filing within three days (as compared to seven work days under the Intellofax System) after initial receipt of the document; and the cards produced would conform in size and information with those in the present file. (An image Minicard could be inserted into the source card as an added step which would make the whole document immediately available for viewing or for obtaining a copy.)
 - b. A second suggestion would be to maintain a hard copy file of the first pages of each document received, annotated to supply information on enclosures or other data and arranged by source, post and report number. This would constitute a file of the same information now available on each source card; it would be sorted, filed and used

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in the same manner as the present file. However, the first pages would vary in size, a new set of cabinets for filing would be required and a completely new file would result. Additional first pages or additional copies of all incoming documents would have to be obtained, or copies of the first page would have to be reproduced by OCR for this purpose. The obvious advantage would be the immediate availability of the "source" information in file upon receipt of the document.

- c. A third possibility is a file of Aperture cards containing image Minicards of the documents organized by locator and document report numbers printed out (interpreted) at the top of each card. This system would require more detailed coding of source locator data by analysts than is presently being done. With this type of file to determine information not printed on the card, such as the title of the document, the number of enclosures, or the classification, it would be necessary to remove the card from file and read the image on a Minicard viewer making the whole process of using the file a slow one. Filing of the cards would be uncomplicated, but needed processing time in the Machine Division would delay their receipt by the Library.
 - d. A fourth possibility would be to furnish interpreted IBM cards showing the control number, source and report date for the "regular" information reports and continue one of the above "source" files for the "non regular" or that category of reports which require a source file. These "non regular" reports would include 25X1X7 Finished Intelligence Studies and similar material now intellofaxed which are difficult to identify without a source file. It would of course be necessary to identify these items at the "input" stage and separately process them through the system so they would not be intermixed with the "regular" items.
 - e. The last possibility and least costly for "input" would be to provide for a "block file" of 3N Minicards filed by source. This file could be used to furnish either prints or Minicard copy (strip film or cut) of desired segments of the file. This however would be a completely blind file and could be used only after machine selection of specified segments and either reproduction of film or paper prints.
4. The group feels that a combination of (a) and (d) above would be the most efficient, but that final determination should be made as a result of experimentation and experience gained in the Minicard Pilot Operation.

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Part II.

D. Discussion of "Aperture Card" File.

1. Under Intellofax the images of reports are contained in aperture cards filed by document control number. This file located in the CIA Library is used for reproducing copies of specified documents requested by CIA or outside offices or for viewing by individuals for reference purposes. An estimated 6,000 copies are reproduced from this file each month. It is also estimated that about 1/3 of these requests result from the Intellofax tape service. Inasmuch as images of the documents are available in the Minicard System when the selection operation has been completed, it can be assumed that the requests for copies of specific documents under Minicard will be reduced by at least 1/3.
2. If duplicate Minicards are filed in report number order in a block file, requests for copies of specific documents would have to be grouped in order to process them efficiently; an urgent request for a copy of one document would require mechanical selection; duplication and processing on the same equipment being used for the regular "input" and "retrieval" service. In addition, individual document images would not be immediately available for viewing as is now possible with the Intellofax aperture card file.
3. Because the Intellofax manual file of aperture cards has proved to be very efficient in servicing requests for copies of specific documents which have been included therein, this group believes that the Minicard System must provide the same type of service and has included such a file in the current plan.
4. It is possible that equipment could be developed which would efficiently furnish copies of specifically desired documents and make obsolete the manually operated aperture card file. However, that will have to be determined by the Minicard Pilot Operation Staff when such equipment is available.

Part II.

E. Discussion of Product Available to the User.

1. The Intellofax System provides the following products to the end user for the documents processed in the System. (See Appendix C 3.)
 - a. Bibliographic data for each document indexed is printed on its index (IBM) cards which are in the various subject and area files. Cards are selected out of these files in response to a request for references to reports which contain certain specified information. The bibliographic data for the selected group of cards is reproduced on an Intellofax "tape" which is given to the requester. In lieu of a tape, the requester may review the selected group of cards to determine the specific documents he needs. The desired documents may be obtained on microfilm or in hard copy as outlined in (c) below.
 - b. A duplicate "unpunched" index card showing the printed bibliographic data for each document is cut down to 3" x 5" size and put into the Source File. This file arranged by source, or post number, etc. can be reviewed manually to identify reports or to obtain cross-reference, enclosure, security and other of the bibliographic data.
 - c. Documents are microfilmed and the images are mounted in an aperture card. These cards are filed in document number order. The document image of a specified document may be viewed in the aperture card on a Microfilm viewer or a photostat copy of it can be obtained. If the document has not been processed into an aperture card because of odd size, bulk or poor copy, it may be viewed on 35mm film or access given to hard copy. If the image is on 35mm film, a copy can be furnished. If only the hard copy is available, it may be borrowed.
2. The Minicard System is presently planned to provide the following products for those documents which have been selected for processing: (See Appendix C 3.)
 - a. A "stick" of duplicate image 3N - Minicards is available by selection for those documents indexed into the system which contain information pertinent to an individual requirement for specified subject and area or subjects and areas as well as other "coded" information such as clear text entries. This "stick" of Minicards may be viewed by the requester in the Analysis Viewer and he may indicate the documents or individual pages for which copies are desired. The "stick" of Minicards is then processed by the enlarger-print machine and photostat copies of the desired documents are reproduced and handed to the requester. In lieu of the "stick" of duplicate image Minicards, the requester may receive microfilm copies on strips or on actifilm for viewing on a "reader" or a "reader-printer" machine, or he may receive prints of first pages or of the complete document. If the document has not been photographed on the Minicard because of odd size, bulk or poor copy, it may be viewed on 35mm film or access given to hard copy. If the image is on 35mm film it may be viewed or a photostat copy obtained. If only the hard copy is available, it may be borrowed.

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- b. A Source File, in place of the bibliographic 3 x 5 cards under the Intellofax System, containing copies of the first pages (or the top 1/3 of the first page) on 3 x 5 heavy paper stock are filed according to source.
 - c. An Aperture Card File containing the image Minicard(s) will be available in a manual file under the Minicard System and be used in the same manner as in Intellofax.
3. More varied products are available to the user under the Minicard System to satisfy his unique needs and when considered with the higher selective capability of the Minicard selector, the relatively fewer end items which must be reviewed by the user should save valuable research time.

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Part III. Present Plan for the Minicard System.

The current plan for installing the Minicard System which will eventually supplant the Intellofax System consists of (1) a complete mechanical test of all the equipment, (2) the establishment of a pilot Minicard operation and the development of standard operating procedures, and (3) the phasing out of the Intellofax System into the Minicard operation.

A. Mechanical Test of Equipment.

1. When all the Minicard equipment has been delivered, installed and operating (see Appendix E for an itemized listing of equipment delivered and on order), a three month's test using all the "hardware" will be made to ensure that all information (and more) in the Intellofax System for a selected group of reports is efficiently retrievable and can be made available to users in a suitable form.
2. In order to have a large enough group of "Minicards" for this purpose, the Machine Division since August 1957 (when the Minicard Camera began operating) has been photographing codes and the related documents for about 60-70% of the CIA information reports being processed into the Intellofax System. The test at the present time is limited to processing master Minicards into the "block" file because the equipment for further processing has not yet been delivered. There were an estimated 13,000 master Minicards in file as of 1 April 1958. Approximately 100 master cards are being added each working day. The codes on these cards were mechanically converted from IBM cards in the Intellofax System so it will be possible to make detailed comparisons between the two systems for the group of reports involved. It is interesting to note that the mechanical conversion from IBM cards to Flexowriter tape was made possible by the new Flexowriter IBM 024 Key Punch Combination which was specifically developed and built for the Machine Division. This machine makes it possible to process the code "input" into the Minicard System in a more orderly and efficient manner than was originally planned for a Minicard operation. Instead of using short lengths of Flexowriter tape for each individual document and splicing them together in the same order as the batch of documents to be photographed, IBM cards are punched, verified and sorted into the desired order and the codes are converted to a continuous tape for a specified group. This permits group processing and practically eliminates all coding transcription errors.

B. Pilot Minicard Operation.

1. Coincidentally with the mechanical test of the equipment, a Pilot Minicard Operation (see Appendix A, Minicard Project Outline, on page 6) is planned to run separate from and in addition to the Intellofax operation using a selected portion of the daily receipts of information reports. It is suggested that the 00-B series of reports (about 75 per day) be selected for processing for the pilot operation. The operation will be used as a means of developing policies and procedures for analysis, input, processing and retrieval. It should be under the direction of the proposed Minicard Pilot Operation staff of the OAD/CR

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composed of a full time Chief and personnel from the Document and Machine Division, the CIA Library and, if required, the OCR Registers. the Chief and key personnel of this staff should be relieved of other duties so they may devote full time to the development and direction of the pilot system. This staff should keep the AD/CR and the CR Division Chiefs completely up-to-date on all plans and procedures as they are being developed, so that complete OCR coordination will be effected. The personnel necessary to operate the pilot system should be assigned to the project by the operating divisions either on a full time or part time basis as required.

2. Although the Minicard duplicator, selector, sorter and enlarger-print processor have not been delivered, the "input" phase for this pilot operation should be started immediately so that a file of Minicards can be created which will be large enough for proper testing purposes. This will require the establishment of the Minicard Operation Staff, the writing of specific terms of reference, the designation of a Chief and the assignment of required personnel.
3. The input for the pilot operation will contain the following data additional to that now contained in Intellofax cards:
 - a. New area codes
 - b. Action codes - new
 - c. Phrase coding
 - d. Clear text entries.

Action codes, phrase coding and clear text entries will provide for the retrieval of information more specifically and in greater depth than is now possible under the Intellofax System. Briefly, this will be the first step toward the establishment of the more sophisticated system made possible by the Minicard method. Furthermore, the pilot operation input will become a permanent part of the file.

4. As the pilot operation is being conducted, the inherent potential of the Minicard method will become better known. This knowledge will suggest a greater usefulness of the equipment. It will become apparent that the greater flexibility in machine language input of the Minicard will permit the consideration of new methods of indexing and retrieval of information. It is assumed that problems of information retrieval posed by researchers and the OCR specialized registers will be submitted to the Minicard Operation Staff. This staff will study the problem in the light of their newly acquired knowledge of Minicard potential and will recommend project studies or changes in input data to solve such problems. This work will start as soon as sufficient knowledge of the Minicard potential has been gained and will be conducted concurrently with the pilot operation.

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5. During the pilot operation specific operating practices will be developed and standard operating procedures will be written. These procedures will have to cover the entire input, operating and retrieval aspects.

C. Phase Out of Intellofax System.

As stated above, the initial input into the pilot operation will consist of approximately 75 CIA OO-B Information Reports a day. As soon as this operation has been "debugged" and maintenance and operating procedures have been finally determined the entire Minicard operation will be turned over to the operating divisions and the Intellofax operation for this group of reports will be discontinued. From this point on, other types of CIA reports and other categories of information reports will be introduced into the Minicard System. Simultaneously, the related Intellofax operations for such categories will be discontinued and the personnel now typing, photographing and inserting microfilm into aperture cards will become available for reassignment to Minicard or other operations. The speed with which this phasing out can be accomplished will depend on how fast personnel can be trained by the operating divisions in Minicard operations and procedures.

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Part IV. Development of Full Potential of Minicard.

1. A previous section entitled "Pilot Minicard Operation" discusses certain limited and relatively immediate steps which can be taken to make more effective the retrieval of information from the Minicard storage system than is now possible from the Intellofax. However, these represent no fundamental change in present coding operations although they will provide for simple correlations between fixed classification and/or action codes. Descriptor terms in plain language will support the formal coding. Whereas the final outcome of this study will in all probability enhance the pertinency and the amount of material retrieved in response to a specific search requirement, it can at best make use of only a small fraction of the retrieval potentialities built into the logical and discriminatory electronic circuits of the Minicard selector. Also it can obviate only to a small degree a basic limitation of any system, mechanical or otherwise, that employs conventional classification practices, namely: that because the processing of information into such a system involves a predetermination of the concepts within the information by which the user will subsequently wish to retrieve, any recall of the information is strictly limited by the decisions as to the indexing entries which are made at the time of processing.
2. In recognition of this basic fact, the Agency some years ago sponsored external research and performed supplementary research internally which went far to develop certain expanded concepts of indexing and classification for use with electronic data-searching machines of the nature of the Minicard selector. This research gave insight into the intriguing possibilities of establishing and monitoring by machine searching obscure correlations of bits of information, the relation of which was not apparent, in fact, often not perceivable at the time information was processed into the system. It showed also the practicality of increasing the capacity of an information storage system to provide essentially unlimited correlations between personalities, institutes, specific subject areas and prescribed action concepts.
3. Since this research was completed there has been no machine available to the Agency with the logical discriminating electronic circuits to permit a quantitative assessment of the exact degree of improvement that would result or the operational changes that would be involved in the application of these expanded indexing concepts to intelligence documents or other types of information.
4. It is believed highly important that a part of the contemplated pilot plant development operation be designed to make such an evaluation in line with the conclusions reached by other task groups and under the direction of an OCR Planning and Management Staff. Specifically it is proposed that:
 - a. A further limited research effort be undertaken at once on a limited and homogeneous segment of intelligence documents that will apply to these expanded and radically different concepts of classifying, coding and indexing, often referred to as multi-dimensional coding. Such an experiment would provide the factual data that must be at hand before policy decisions can possibly be made as to the feasibility and desirability of adoption.

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- b. The efforts should be directed in part to the intellectual problem concerned with the scientific and generic relationships in the language of the test set of documents. It should also determine the degree of specificity which needs to pertain in the processing of the information for machine searching. It would measure the improvement that would result in the pertinency in the information recovered in response to detailed search requirements and clearly define the operations involved in processing and retrieving.
5. Whereas this recommended limited phase of the work need not extend the specific coding methodology developed in the prior research and since then considerably expanded by certain private interests, it is virtually certain that the desired factual material can be obtained most readily by doing so.
 6. It is visualized that this development work would be done partly under external contract and partly through close cooperation between task forces within using offices of the Agency and the Minicard System operational personnel.
 7. Supplementary development projects which would add to the information provided by this proposed project should also be undertaken. There could be made available to the Agency material which has been coded by these expanded indexing concepts in two areas: (1) purely scientific, comprising coded abstracts for the world metallurgical literature for the past year or so; and (2) material of a news nature which was prepared for the purpose of supporting research in the production of what might be termed industrial intelligence. Should evaluation of material retrieved by the Minicard selector from both types of encoded material under a planned program of search requirements be undertaken relatively soon, the results could be expected to influence the direction of the principal project first discussed.
 8. It has already been stated that the Minicard System is capable of providing essentially unlimited correlations by personalities, institutes, specific subject areas and prescribed action concepts. Hence, the impact of such a possibility on the operations of the Biographic and Industrial Registers as now practiced is extremely important in any complete evaluation of the Minicard System. It seems to us, therefore, that concurrently with the experiments already proposed similar limited experiments selected from segments of material handled by both Registers should be undertaken.

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Part V. Discussion of Consultant's Comments on Minicard.

1. Consultant's Report XI 4:

"Present planning for Minicard offers no solution to the present low intellectual level of Intellofax. It is identical also in the large number of false sorts that will result, and will tie the analyst to a reading machine to get even the titles of the documents included in the batch sent to him. This will cost more of the analyst's time."

We believe the "intellectual level" of any indexing-retrieval system whether it be manual, Intellofax, Minicard or any other, is determined by document selection, the classification code and its application, rather than by the equipment used. As stated in the beginning of this report on page 5, we believe it highly essential to determine what categories of documents should be indexed, what specific information in the documents selected should be coded and what classification system(s) should be used to best support intelligence research. However, these matters which determine the "intellectual level" of a system are considered outside the scope of this report. Given the same input as Intellofax, we believe Minicard will give more selective search results and greater choice of form of end product with less elapsed time. Minicard will not "tie the analyst to a reading machine to get even titles of the documents" if he does not so desire; he should receive fewer documents or images to view which are not pertinent to his search due to the greater selectivity of the Minicard equipment.

2. Consultant's Report XXXI 58:

"Minicard appears to offer some definite advantages over Intellofax in terms of the storage and reproduction of materials but it is currently being considered on the same intellectual level as Intellofax. The system has not been studied fully and it is not possible to predict that it will make any great improvement in the program efficiency of the Agency in the whole information retrieval cycle."

The first part of this comment relative to "the intellectual level" was discussed in paragraph (1) above. Regarding the balance of the comment, we believe that the Minicard System has not only "the advantage over Intellofax in terms of the storage and reproduction of materials", but has the potential of increasing the efficiency of the retrieval of information contained in the reports and documents processed into the system. A realistic estimate of the increased efficiency will have to await the results of the pilot operation. We believe that the Minicard System when evolved will result in a great improvement in the retrieval of information over the present Intellofax System. (See Part II beginning on page 6.)

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3. Consultant's Report page 140-141:

- (a) "Development of the Minicard machine is still in process and no one as yet has a complete set of the machines. It should be noted, however, that there has been no study of the Minicard System in terms of manpower required, the number of machines required, the amount of retrieval that can be handled per installation, the intellectual level that can be achieved through the Minicard System, or any of the other basic data that should be obtained."

Although a complete set of machines has not yet been delivered, we agree with the Consultant's that a complete systems study should be made. Accordingly we have recommended that a Minicard Operation Staff be established to evolve a complete system pilot operation and determine the requirements, capabilities and potential of the Minicard System. We do not believe such a study is possible otherwise. OCR has been remiss in not having established this staff as proposed in the Minicard Project Outline. (See Appendix A, page 6).

- (b) "As it stands, under the best of conditions, it will be a year and a half after the camera is delivered before anybody has any idea whether this system will give the Agency anything that it does not now have or could not have better by means of other types of bibliographic tools."

The group is concerned with Minicard as compared to Intellofax and has not studied "other types of bibliographic tools". As stated throughout our report, we believe that Minicard will have advantages over Intellofax.

- (c) "The Assistant Director/OCR was asked on 9 May 1957 whether there was a staff paper or a formal report evaluating the gains anticipated from the Minicard System. He said that there had been no such report but there had been a good deal of staff thinking about it. He referred the Consultant's to the head of the Machine Division for information about the anticipated operation of the system."

"The conference with the Head of the Machine Division on 9 May indicated that no working paper had been prepared and that the only thing that had been put down on paper on this proposal was a preliminary staff study to get funds for the program, but that was, in his judgment, too general to justify study."

The above comments and those which followed on pages 141,2 of their report were made to illustrate the Consultants' opinion that OCR failed "to follow through on planning of projects." This group being only concerned with the

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Minicard Project has stated above that OCR was tardy in establishing a Staff to follow through with the Minicard project. However, it should be noted that the "preliminary staff study", mentioned above by the Consultant's, provided on page 6 (see Appendix A) for a task group "to operate a full line of Minicard equipment paralleled to but separate from its Intellofax program." It was further provided that "since a parallel set of equipment will be available in Air Force, the two agencies will establish a joint program for Minicard processing of their respective document production during the test period."

4. Consultant's Report page 142:

"It is quite possible that with proper planning, the Minicard System can be used for part of the storage and retrieval job. In the present state of the art, it does not appear that the Minicard System will solve any of the urgent problems of speed and quality of service outlined above. A great deal of high-level study and planning needs to be undertaken to determine the areas in which this tool can be used effectively, rather than plunging into it as a solution for intellectual problems which have not been approached at all in the preparation for the installation of Minicard."

We believe that not only can Minicard be used to advantage for part of the storage and retrieval job, but that it will also solve many of "the urgent problems of speed and quality of service." We agree that a lot of planning, coordinating, testing and experimentation needs to be undertaken "to determine the areas in which this tool can be used effectively."

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